MBTA
State of the Service:
Green Line Light Rail
May 2, 2016
Key Facts: Green Line

- Over 200,000 trips each weekday—the nation’s busiest light rail line
- 66 stations
- Right of Way
  - 31 track miles (yard + revenue)
  - 82 switches
  - 5 miles of tunnel section
  - 51 traffic signalized intersections
- 204 light rail vehicles
  - Type 7: 110
  - Type 8: 94
Key Issues: Green Line

• Ridership and Capacity

• Safety Investments

• Fleet Condition and Age

• Infrastructure Condition and Age

• Accessibility
18 ventilation shafts
38 ventilation fans
235 miles of power cable
19 power substations
165 wayside signal equipment cases

241k tons ballast, 131,225 rail ties, and 5.2 miles of tunnel; 82 switches

Fleet Facilities
Riverside
Boston College
Reservoir

drawing not to scale
Green Line Tracking: In place January 2016
Performance: Green Line

Green Line Reliability Performance
(percent of passengers waiting no more than the scheduled headway)
# Customer Survey: Green Line

**Source:** March 2016 Customer Opinion Panel (N=62)

## How would you rate the MBTA overall?

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremely Dissatisfied</td>
<td>5%</td>
</tr>
<tr>
<td>Very Dissatisfied</td>
<td>15%</td>
</tr>
<tr>
<td>Somewhat Dissatisfied</td>
<td>15%</td>
</tr>
<tr>
<td>Neutral</td>
<td>8%</td>
</tr>
<tr>
<td>Somewhat Satisfied</td>
<td>34%</td>
</tr>
<tr>
<td>Very Satisfied</td>
<td>21%</td>
</tr>
<tr>
<td>Extremely Satisfied</td>
<td>3%</td>
</tr>
</tbody>
</table>

## How would you rate this trip overall?

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>8%</td>
</tr>
<tr>
<td>Disagree</td>
<td>5%</td>
</tr>
<tr>
<td>Slightly Disagree</td>
<td>13%</td>
</tr>
<tr>
<td>Neither Agree nor Disagree</td>
<td>12%</td>
</tr>
<tr>
<td>Slightly Agree</td>
<td>22%</td>
</tr>
<tr>
<td>Agree</td>
<td>32%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>8%</td>
</tr>
</tbody>
</table>

## The MBTA provides reliable public transportation services.

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>14%</td>
</tr>
<tr>
<td>Disagree</td>
<td>17%</td>
</tr>
<tr>
<td>Slightly Disagree</td>
<td>19%</td>
</tr>
<tr>
<td>Neither Agree nor Disagree</td>
<td>10%</td>
</tr>
<tr>
<td>Slightly Agree</td>
<td>24%</td>
</tr>
<tr>
<td>Agree</td>
<td>12%</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>5%</td>
</tr>
</tbody>
</table>
Green Line Average Weekday Unlinked Trips and Average Weekday Tap-Ins

Discussion & Policy Purposes Only
Background

- Major accidents
  - May 2008 – 1 fatality and multiple injuries
  - May 2009 – multiple injuries
- July 2008: NTSB Safety Recommendation
- Feb 2010: DPU Corrective Action Plan
- Dec 2012: Green Line PTC presentation to MassDOT Board

Train Control Systems

- Initial focus was on Positive Train Control
- Evaluation of alternative technologies with a focus on preventing signal violations and train to train collisions
- Discussion with regulatory agencies on next steps
- Presentation on System Safety
Fleet: Green Line

204 Vehicles with 146 Required for Peak Service

Type 7 – High Floor
- 3600 Series, 1986, 90 cars
- 3700 Series, 1997, 20 cars
- MDBF 5,336 vs. goal of 5,500

Type 8 – Low Floor
- 1999-2008, 94 cars
- MDBF 3,808 vs. goal of 5,500

Type 9 – Low Floor, support GLX service
- 2017-18, 24 cars
- $182.7 m
- Design review and prototyping
- On schedule
Infrastructure Condition and Age: Green Line

Signal
- Portions date to early 1900s
- 25Hz Track Circuit Components Obsolete and Unavailable
- Re-use and Reconditioning of Components is Unsustainable

Track
- Beacon Junction Track Condition
- Cross Drives – B, C and E Lines
- Central Subway Work Constraints

Power
- Traction Power Substation Age
- Negative Return Replacements
Accessibilty: Green Line Stations

Accomplishments

• 32 of 66 stops are accessible
• 31 street-level stops are inaccessible
• Government Center Opened March 2016
• Hynes Station in project development
• BU West, St. Paul, Babcock, Pleasant St. under design and will be consolidated into two new accessible stations
• Challenges include need for lane shifting and coordination with Cities/Towns
• PATI will consider future opportunities for surface station consolidation
Accessibility: Green Line Vehicles

- 94 fully-accessible Type 8 cars in service
- 102 Type 7 cars in service
  - Require use of mobile lift to board
- Policy requires a Type 8 to be part of consist when possible
- Long-term: Provide level boarding—raise platforms to meet car floor of new vehicles
Critical Management Focus:

- Fare Collection and Fare Evasions
- Crowding and Dwell Times
- Stop Spacing on Surface Lines
- Transit Signal Prioritization
- Capacity
Dwell time: Green Line

- Longwood Medical Area, 3,793
- Harvard Ave, 3,604
- Brigham Circle, 2,535
- Fenway, 3,488
- Chestnut Hill Ave, 626
- Back of the Hill, 35

Late 2014 Surface Stations Boardings per day

Average of Median IB and OB Dwell Time (seconds)

Average Daily Boardings
Preferred Station Spacing: 1,200’ – 1,400’. B Line Average = 1,234’

Stop Pairs Below the Preferred Spacing on Surface B Line

<table>
<thead>
<tr>
<th>Stop Pairs Below the Preferred Spacing on Surface B Line</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saint Paul Street → Boston University West</td>
<td>589</td>
</tr>
<tr>
<td>Babcock Street → Pleasant Street</td>
<td>764</td>
</tr>
<tr>
<td>Pleasant Street → Saint Paul Street</td>
<td>765</td>
</tr>
<tr>
<td>Boston University Central → Boston University East</td>
<td>800</td>
</tr>
<tr>
<td>Warren Street → Allston Street</td>
<td>803</td>
</tr>
<tr>
<td>Allston Street → Griggs Street</td>
<td>924</td>
</tr>
<tr>
<td>Packards Corner → Babcock Street</td>
<td>962</td>
</tr>
<tr>
<td>Boston Univ East → Blandford Street</td>
<td>997</td>
</tr>
<tr>
<td>Griggs Street → Harvard Avenue</td>
<td>1,097</td>
</tr>
</tbody>
</table>

Stop Consolidation Planned
Commonwealth Avenue

Final Design Late 2016/Construction 2017-18
Transit Signal Prioritization

Improve Reliability on Surface Segments
- Allow trains to request extra time to clear the intersection
- Utilizes new GPS tracking

Partnering with City of Boston
- Target: 4 intersections by summer 2016
Capacity

Limitations to Three Car Trains

• System Bottlenecks: Kenmore, Copley and Park Street
• Multi-Vehicle Communication Reliability
• Park St. and Government Center utilize double berthing of two car sets
• Traction Power Substation and Cable Loads
Moving Forward: Green Line

- Operations team focus on managing performance with newly available data

- Accessibility
  - Major stations complete
  - Surface station spacing and upgrades

- Safety briefing to FMCB

- Integrated fleet plan update – summer 2016

- Infrastructure improvements for safety, reliability and capacity